



NASA Potential Usage of High Temperature Components and Systems

*Presented to
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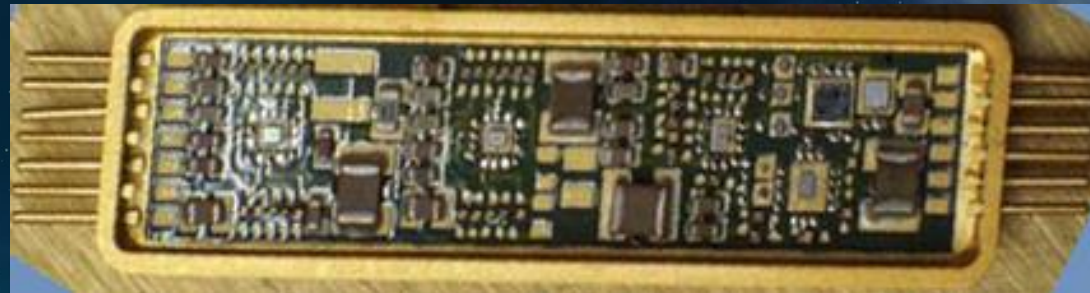
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TA 3: Space Power and Energy Storage

3.3.3.5 High-Temperature Semiconductors, Passive Components, and Interconnects:

Develop new high-temperature semiconductor switches, switch drivers diodes, high-temperature capacitors, and magnetic wire and interconnection techniques to permit the high-temperature operation of switchgear and permit reduction in the heat rejection system.



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3.3.5.2 High-Temperature, High-Voltage Capacitors:
Low equivalent series resistance (ESR), high-voltage capacitors that can operate in the intended space environment are critical to successful converter design.



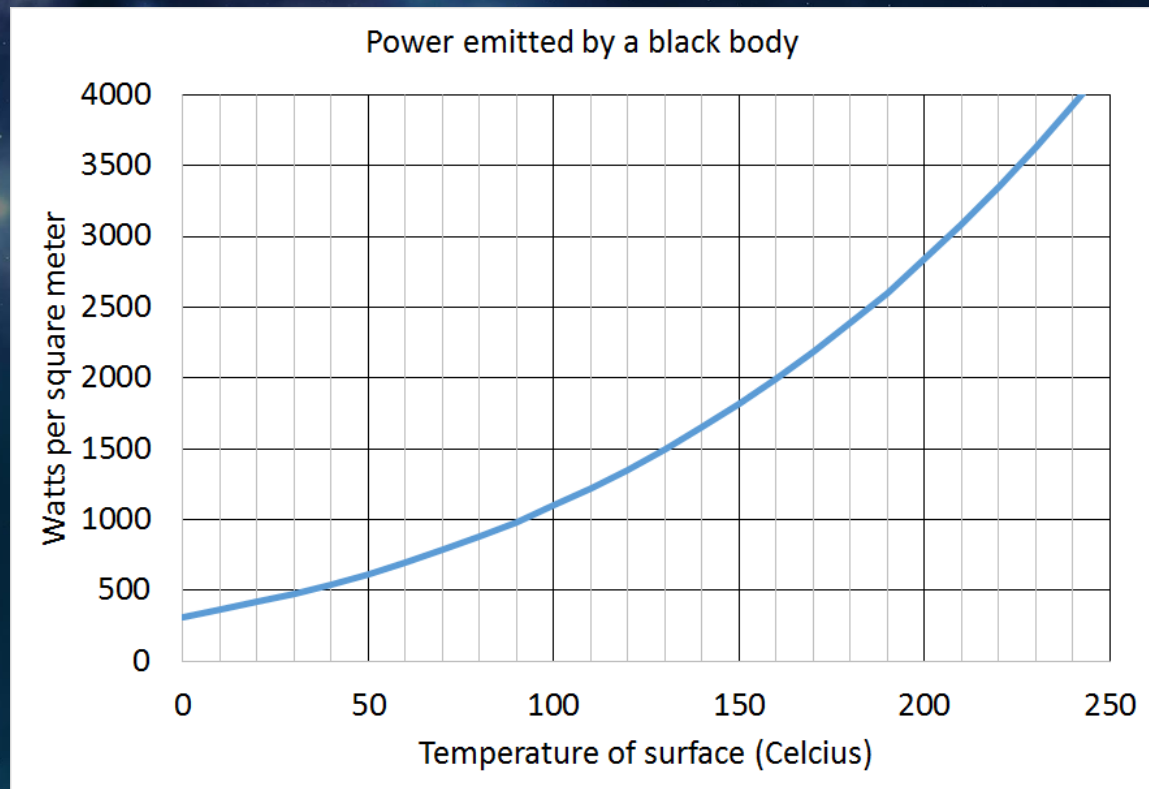
Advantages of high temperature electronics for NASA



- Passive cooling of power converters
- Use of coolants with higher temperature improves efficiency of active cooling systems.
- Operation in high temperature environments
 - Nuclear reactor
 - surface of Venus
- Placement of control electronics closer to hot load
 - Motor control and power conditioning at the motor.



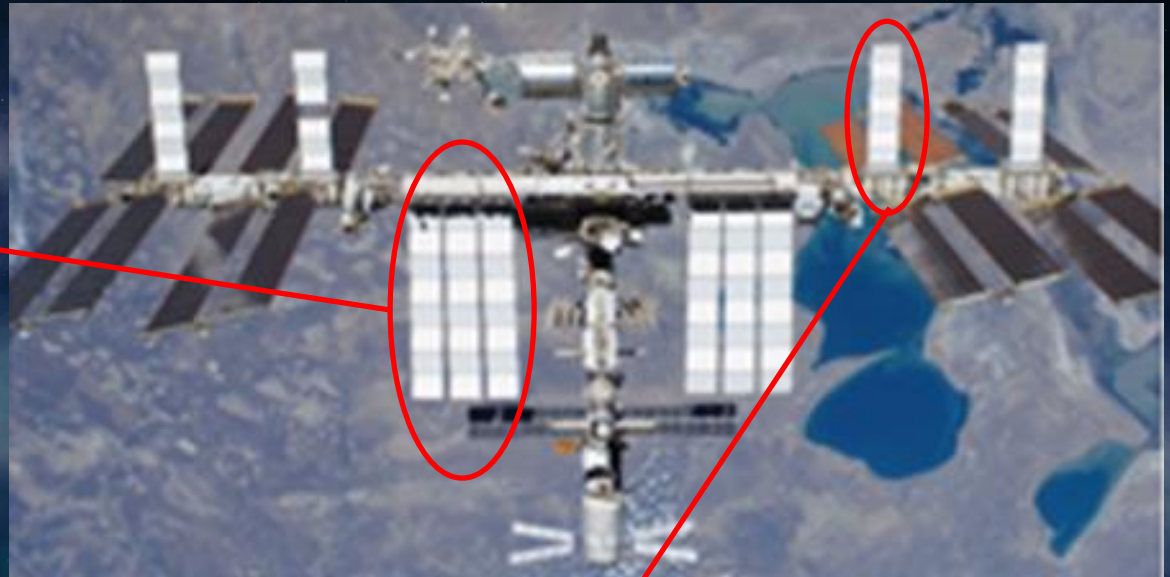
Deep space missions have only one way to dissipate heat without losing mass: thermal radiation.



ISS Active Thermal Control systems



ATCS:
controls Lab space
and associated
equipment



PVTCS: Photovoltaic Thermal Control System
Cools batteries and associated power electronics, including
DC/DC converters.